CLAIMS

1. A plasma display panel comprising a first plate and a second plate that face each other with a space therebetween, the first plate having first electrodes on a facing surface thereof, the second plate having second electrodes on a facing surface thereof, the space being filled with a gas medium,

wherein the first electrodes, or both the first electrodes and the second electrodes include electrodes made of a silver alloy, the silver alloy being composed of Ag as a main constituent and at least one transition metal selected from the group consisting of Cu, Co, Ni, Cr, Mn, and Fe.

2. The plasma display panel of Claim 1,

wherein an amount of the transition metal contained in the silver alloy is in a range of 5wt% to 20wt% inclusive.

3. A plasma display panel comprising a first plate and a second plate that face each other with a space therebetween, the first plate having first electrodes on a facing surface thereof, the second plate having second electrodes on a facing surface thereof, the space being filled with a gas medium,

wherein the first electrodes, or both the first

electrodes and the second electrodes include silver electrodes made of Ag and glass that contains at least one transition metal oxide selected from the group consisting of CuO, Cr_2O_3, NiO, Mn_2O_3, Co_2O_3, and Fe_2O_3.

4. The plasma display panel of Claim 3, wherein an amount of the transition metal oxide contained in the glass is in a range of 5wt% to 20wt% inclusive.

5. The plasma display panel of Claim 3, wherein the glass is one of PbO glass, Bi_2O_3 glass, and ZnO glass.

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6. The plasma display panel of any of Claims 1 to 5, wherein the first electrodes are constructed by forming each electrode on a transparent electrode film.

7. The plasma display panel of any of Claims 1 to 5, wherein the first electrodes are covered with a dielectric layer made of a dielectric glass material.

8. A plasma display panel comprising a first plate and a second plate that face each other with a space therebetween, the first plate having first electrodes on

a facing surface thereof, the second plate having second electrodes on a facing surface thereof, the space being filled with a gas medium,

wherein the first electrodes, or both the first electrodes and the second electrodes include electrodes made of a silver alloy, the silver alloy being composed of Ag as a main constituent and at least one metal selected from the group consisting of Ru, Re, Rh, Os, and Ir.

9. The plasma display panel of Claim 8,

wherein an amount of the metal contained in the silver alloy is in a range of 5wt% to 20wt% inclusive.

10. A plasma display panel comprising a first plate and a second plate that face each other with a space therebetween, the first plate having first electrodes on a facing surface thereof, the second plate having second electrodes on a facing surface thereof, the space being filled with a gas medium,

wherein the first electrodes, or both the first electrodes and the second electrodes include silver electrodes made of Ag and glass that contains at least one metal oxide selected from the group consisting of RuO_2, RhO, IrO_2, OsO_2, ReO_2, and PdO.

11. The plasma display panel of Claim 10,

wherein an amount of the metal oxide contained in the glass is in a range of 5wt% to 20wt% inclusive.

12. The plasma display panel of Claim 10,

wherein the glass is one of $PbO-B_2O_3-SiO_2$ glass, $Bi_2O_3-B_2O_3-SiO_2$ glass, and $P_2O_5-B_2O_3-SiO_2$ glass.

13. The plasma display panel of any of Claims 8 to 12,

wherein the first electrodes are covered with a dielectric layer made of a dielectric glass material.

14. A plasma display panel comprising a first plate and a second plate that face each other with a space therebetween, the first plate having first electrodes on a facing surface thereof, the second plate having second electrodes on a facing surface thereof, the space being filled with a gas medium,

wherein the first electrodes, or both the first electrodes and the second electrodes are made of Ag particles, surfaces of which are each coated with a metal or a metal oxide.

15. The plasma display panel of Claim 14,

wherein the metal oxide includes at least one selected from the group consisting of Al_2O_3, NiO, ZrO_2, CoO, Fe_2O_3,

ZnO, In_2O_3, CuO, TiO_2, Pr_6O_{11}, and SiO_2.

16. The plasma display panel of Claim 14,

wherein the metal includes at least one selected from the group consisting of Ru, Rh, Ir, Os, and Re.

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17. The plasma display panel of any of Claims 14 to 16,

wherein the metal or the metal oxide that coats the surface of each Ag particle forms a layer with an average thickness in a range of 0.1 μm to 1 μm inclusive.

18. The plasma display panel of any of Claims 14 to 16,

wherein the first electrodes are covered with a dielectric layer made of a dielectric glass material.

19. A plasma display panel comprising a first plate and a second plate that face each other with a space therebetween, the first plate having first electrodes containing silver on a facing surface thereof, the second plate having second electrodes on a facing surface thereof, the space being filled with a gas medium;

wherein the facing surface of the first plate has been processed so that a concentration of metal ions in a vicinity of the facing surface of the first plate is

1000ppm or less, the metal ions possessing reducing action on Ag ions.

20. A plasma display panel comprising a first plate and a second plate that face each other with a space therebetween, the first plate having first electrodes containing silver on a facing surface thereof, the second plate having second electrodes on a facing surface thereof, the space being filled with a gas medium;

wherein the facing surface of the first plate has been processed so that a total concentration of tin with less than four valence electrons, manganese with less than four valence electrons, iron with less than two valence electrons, and indium with less than two valence electrons in a vicinity of the facing surface of the first plate is 1000ppm or less.

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21. The plasma display panel of any of Claims 19 and 20,

wherein the first plate, or both the first plate and the second plate are glass plates.

22. A display apparatus comprising:

the plasma display panel of any of Claims 1, 3, 8, 10, 14, 19, and 20; and

a driving circuit that drives the plasma display

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panel.

23. Silver powder for use in an electrode of a plasma display panel, the silver powder being composed of

Ag particles each being coated with a metal or a metal oxide.

24. The silver powder for use in an electrode of a plasma display panel of Claim 23,

wherein the metal includes at least one selected from the group consisting of Pd, Cu, Cr, Ni, Ir, Rh, and Ru.

25. The silver powder for use in an electrode of a plasma display panel of Claim 23,

wherein the metal is formed on a surface of each Ag particle as a layer by an electroless plating method.

26. The silver powder for use in an electrode of a plasma display panel of Claim 23,

wherein the metal oxide includes at least one selected from the group consisting of Al_2O_3, NiO, ZrO_2, CoO, Fe_2O_3, ZnO, In_2O_3, CuO, TiO_2, Pr_6O_{11}, and SiO_2.

27. The silver powder for use in an electrode of a plasma display panel of Claim 23,

wherein the metal or the metal oxide is formed on a surface of each Ag particle as a layer by a mechanofusion method.

28. The silver powder for use in an electrode of a plasma display panel of Claim 23,

wherein the metal oxide is formed on a surface of each Ag particle as a layer by a sol-gel method.

29. A manufacturing method for a plasma display panel comprising:

a first electrode arrangement step for arranging first electrodes on a surface of a first plate;

a second electrode arrangement step for arranging second electrodes on a surface of a second plate; and

a placement step for

(a) placing the first plate and the second plate with a space therebetween, so that the first electrodes and the second electrodes face each other, and

(b) enclosing a gas medium in the space between the first plate and the second plate,

wherein the first electrode arrangement step, or both the first electrode arrangement step and the second electrode arrangement step include an electrode formation step for forming electrodes made of a silver alloy, the silver alloy being composed of Ag as a main constituent

and a transition metal.

30. A manufacturing method for a plasma display panel comprising:

a first electrode arrangement step for arranging first electrodes on a surface of a first plate;

a second electrode arrangement step for arranging second electrodes on a surface of a second plate; and

a placement step for

(a) placing the first plate and the second plate with a space therebetween, so that the first electrodes and the second electrodes face each other, and

(b) enclosing a gas medium in the space between the first plate and the second plate,

wherein the first electrode arrangement step, or both the first electrode arrangement step and the second electrode arrangement step include an electrode formation step for forming electrodes made of a silver alloy, the silver alloy being composed of Ag as a main constituent and at least one metal selected from the group consisting of Ru, Re, Rh, Os, and Ir.

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31. The manufacturing method for a plasma display panel of any of Claims 29 and 30,

wherein in the electrode formation step, the electrodes made of the silver alloy are formed, by forming

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the silver alloy into a film by a sputtering method, and patterning the formed film.

32. The manufacturing method for a plasma display panel of any of Claims 29 and 30,

wherein in the electrode formation step, the electrodes made of the silver alloy are formed, by (a) forming a film containing the silver alloy and a glass frit, (b) patterning the formed film, and (c) baking the patterned film.

33. The manufacturing method for a plasma display panel of Claim 32,

wherein in the electrode formation step, the electrodes made of the silver alloy are formed, by forming a film containing the silver alloy, a glass frit, and a photosensitive organic binder, and patterning the formed film by a photoresist method.

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34. The manufacturing method for a plasma display panel of any of Claims 29 and 30,

wherein in the electrode formation step, the electrodes made of the silver alloy are formed, by applying a paste containing the silver alloy and a glass frit in electrode shapes, and baking the applied paste.

35. The manufacturing method for a plasma display panel of Claim 34,

wherein in the electrode formation step, the electrodes made of the silver alloy are formed, by applying a paste containing the silver alloy, a glass frit, and an organic binder in electrode shapes by a screen-printing method.

36. A manufacturing method for a plasma display panel comprising:

a first electrode arrangement step for arranging first electrodes on a surface of a first plate;

a second electrode arrangement step for arranging second electrodes on a surface of a second plate; and

a placement step for

(a) placing the first plate and the second plate with a space therebetween, so that the first electrodes and the second electrodes face each other, and

(b) enclosing a gas medium in the space between the first plate and the second plate,

wherein the first electrode arrangement step, or both the first electrode arrangement step and the second electrode arrangement step include an electrode formation step for forming silver electrodes, by (a) forming a film made of a mixture of silver and a glass frit, the glass frit containing a transition metal oxide, (b) patterning

the formed film, and (c) baking the patterned film.

37. A manufacturing method for a plasma display panel comprising:

a first electrode arrangement step for arranging first electrodes on a surface of a first plate;

a second electrode arrangement step for arranging second electrodes on a surface of a second plate; and

a placement step for

(a) placing the first plate and the second plate with a space therebetween, so that the first electrodes and the second electrodes face each other, and

(b) enclosing a gas medium in the space between the first plate and the second plate,

wherein the first electrode arrangement step, or both the first electrode arrangement step and the second electrode arrangement step include a silver electrode formation step for forming silver electrodes by (a) forming a film made of a mixture of silver and a glass frit, the glass frit containing a transition metal oxide, (b) patterning the formed film, and (c) baking the patterned film, the transition metal oxide including at least one selected from the group consisting of RuO_2, RhO, IrO_2, OsO_2, ReO_2, and PdO.

38. A manufacturing method for a plasma display panel

comprising:

a first electrode arrangement step for arranging first electrodes on a surface of a first plate;

a second electrode arrangement step for arranging second electrodes on a surface of a second plate; and

a placement step for

(a) placing the first plate and the second plate with a space therebetween, so that the first electrodes and the second electrodes face each other, and

(b) enclosing a gas medium in the space between the first plate and the second plate,

wherein the first electrode arrangement step, or both the first electrode arrangement step and the second electrode arrangement step include:

a coating step for coating surfaces of Ag particles each with a metal or a metal oxide; and

a silver electrode formation step for forming silver electrodes using the coated Ag particles.

39. The manufacturing method for a plasma display panel of Claim 38,

wherein in the silver electrode formation step, the silver electrodes are formed, by (a) forming a film made of a mixture of the coated Ag particles and a glass frit, (b) patterning the formed film, and (c) baking the patterned film.

40. The manufacturing method for a plasma display panel of Claim 38,

wherein in the silver electrode formation step, the silver electrodes are formed by (a) applying a paste in electrode shapes, the paste containing the coated Ag particles and a glass frit, and (b) baking the applied paste.

41. The manufacturing method for a plasma display panel of Claim 38,

wherein in the coating step, the surfaces of the Ag particles are each coated with the metal by a plating method.

42. The manufacturing method for a plasma display panel of Claim 38,

wherein in the coating step, the surfaces of the Ag particles are each coated with the metal oxide by one of a mechanofusion method and a sol-gel method.

43. A manufacturing method for a plasma display panel comprising:

an etching step for etching a surface of a first plate to remove metal ions present therein, the metal ions possessing reducing action on Ag ions;

an electrode arrangement step for arranging first electrodes that contain silver on the surface of the first plate; and

a placement step for

(a) placing the first plate and a second plate on whose surface second electrodes are arranged, with a space therebetween, so that the first electrodes and the second electrodes face each other, and

(b) enclosing a gas medium in the space between the first plate and the second plate.

44. A manufacturing method for a plasma display panel comprising:

a deactivating step for subjecting a first plate on a deactivating process that deactivates reducing action of metal ions on Ag ions;

an electrode arrangement step for arranging first electrodes that contain silver on a surface of the first plate; and

a placement step for

(a) placing the first plate and a second plate on whose surface second electrodes are arranged, with a space therebetween, so that the first electrodes and the second electrodes face each other, and

(b) enclosing a gas medium in the space between the first plate and the second plate.

45. A manufacturing method for a plasma display panel comprising:

a silver electrode precursor forming step for forming silver electrode precursors on a surface of a first plate, the silver electrode precursors being made of a mixture of silver and a glass frit;

a dielectric layer precursor forming step for forming a dielectric layer precursor on the surface of the first plate so as to cover the silver electrode precursors formed thereon;

a baking step for baking the silver electrode precursors and the dielectric layer precursor simultaneously to form first electrodes and a dielectric layer; and

a placement step for

(a) placing the first plate and a second plate on whose surface second electrodes are arranged, with a space therebetween, so that the first electrodes and the second electrodes face each other, and

(b) enclosing a gas medium in the space between the first plate and the second plate.

46. A manufacturing method for a substrate for use in a plasma display panel comprising

an etching step for etching a surface of a glass

plate to remove metal ions present therein, the metal ions possesssing reducing action on Ag ions.

47. The manufacturing method for a substrate for use in a plasma display panel of Claim 46,

wherein in the etching step, the glass plate is etched so that an etching depth from the surface of the glass plate is at least 5 μm but not more than 20 μm.

48. The manufacturing method for a substrate for use in a plasma display panel of any of Claims 46 and 47,

wherein in the etching step, the glass plate is etched by impregnating the surface of the glass plate with a liquid containing fluorine.

49. The manufacturing method for a substrate for use in a plasma display panel of any of Claims 46 to 48,

wherein in the etching step, the glass plate is etched so that a concentration of metal ions that exist in a vicinity of a surface of the etched substrate is 1000ppm or less, the metal ions possessing reducing action on Ag ions.

50. The manufacturing method for a substrate for use in a plasma display panel of any of Claims 46 to 48,

wherein in the etching step, the glass plate is etched so that a total concentration of tin with less than four

valence electrons, manganese with less than four valence electrons, iron with less than two valence electrons, and indium with less than two valence electrons that exist in a vicinity of a surface of the etched substrate is 1000ppm or less.

51. The manufacturing method for a substrate for use in a plasma display panel of any of Claims 46 to 48,

wherein the etching step is followed by a polishing step for polishing the surface of the etched substrate.

52. A manufacturing method for a substrate for use in a plasma display panel, comprising

a deactivating step for subjecting a glass plate to a deactivating process for deactivating reducing action of metal ions on Ag ions.

53. The manufacturing method for a substrate for use in a plasma display panel of Claim 52,

wherein in the deactivating step, the glass plate is heated in an oxidizing gas atmosphere.

54. The manufacturing method for a substrate for use in a plasma display panel of Claim 53,

wherein in the deactivating step, a heating temperature is 500℃ or higher.

55. The manufacturing method for a substrate for use in a plasma display panel of any of Claims 52 to 54, wherein in the deactivating step, the glass plate is processed so that a total concentration of tin with less than four valence electrons, manganese with less than four valence electrons, iron with less than two valence electrons, and indium with less than two valence electrons that exist in a region of 5 μm in depth from a surface of the substrate is 1000ppm or less.